region for separating components of the sample, and a transition region connecting the reaction chamber to the separation region. The reaction chamber, transition region, and separation region are formed in and enclosed by the body. Additionally, the transition region includes at least one flow restrictor for controlling the flow of fluid between the reaction chamber and the separation region. Further, the portion of the body defining the transition region has lower thermal conduction than the portion of the body defining the reaction chamber so that the transition region substantially thermally isolates the reaction chamber from the separation region.--

Please replace the paragraph beginning at page 5, line 4, with the following paragraph:

--The body may be surrounded by external, functional components such as differential pressure sources, electro-motive sources, heaters, light sources, and optical detectors. In the preferred embodiment, the reaction chamber is an amplification chamber for amplifying nucleic acid in the sample. Also in the preferred embodiment, the separation region comprises an electrophoresis column or capillary containing a suitable matrix material, such as electrophoresis gel or buffer, for separating nucleic acid fragments in the sample.--

Please replace the paragraph beginning at page 5, line 16, with the following paragraph:

--Fig. 1 is a schematic view of a processing device having an integrated reaction chamber, transition region, and capillary electrophoresis separation region according to one embodiment of the present invention.--

Please replace the paragraph beginning at page 6, line 13, with the following paragraph:

--The present invention provides an integrated device for the processing of a fluid sample. The device comprises a reaction chamber, a product separation region, and a fluid transition region connecting the reaction chamber to the separation region. In the preferred embodiment, the reaction chamber, transition region, and separation region are formed in and enclosed by a body, preferably a molded piece of polymeric material.--

Please replace the paragraph beginning at page 7, line 22, with the following paragraph:

--Fig. 1 shows one embodiment of a processing device **2** formed by a body **4**. The body **4** has formed therein a reaction chamber **6**, a separation region **8**, and a transition region **10** connecting the reaction chamber to the separation region. The reaction chamber **6** has an inlet port **12** for adding sample and reagents as required by the particular reaction performed in the chamber. The device **2** may include an outlet port as well as the inlet port **12**. The ports may serve to connect the device to an external pump, vacuum source, or syringe. Alternatively, the ports may function as vents. In this embodiment, the separation region **8** is a capillary electrophoresis tube **14** containing appropriate separation material, e.g. electrophoresis gels or polymers, for separating components of the sample. Such separation materials are well known in the art.--

Please replace the paragraph beginning at page 8, line 4, with the following paragraph:

--The integrated device **2** also includes an injection electrode **20** and a separation electrode **22** embedded in the body **4**. The electrodes **20** and **22** are located at opposite ends of the device to drive electrophoretic, electro-osmotic, or IEF ion flow through the separation region **8**. Each electrode is preferably embedded in the body **4** such that one end of the electrode protrudes through an external surface of the body and such that the other end of the electrode protrudes into an internal region of the body.--

Please replace the paragraph beginning at page 10, line 13, with the following paragraph:

--Flow between the reaction chamber and the separation region may be by differential pressure, hydrodynamic forces, electrical motive forces, capillary action, pneumatic forces, hydraulic forces, mechanical forces, etc. The device may be coupled to instruments to actuate fluid flow such as pumps, vacuums, electrical connections, and the like. Electromotive mobility of molecules, and especially nucleic acids, as in isoelectric focus and electrophoretic mobility, is a convenient movement mechanism because of the predictability of movement. When conditions such as buffer ionic strength, channel dimensions, gel type and density, current density, voltage drop, time, etc. are constant, it is relatively easy to predict the location of molecules. Under

controlled conditions, at time (T), the position of the analyte should be at position (X) consistently. This concept is illustrated in Fig. 5 in which site **114** denotes the location of the target.--

Please replace the paragraph beginning at page 11, line 25, with the following paragraph:

--The electrodes may be embedded into the device with little additional cost by several techniques. First, metal electrodes can be situated inside a plastic injection molding production machine and "over-molded" during the injection molding process. Second, the metal electrodes may be selectively screen-printed, or otherwise deposited by plating, thin-film deposition, etc., and patterned on the body of the device. For example, one end of a screen-printed metal line may be used to contact fluid in the device while the other end forms a connector which is electrically engaged by an external instrument. Both of these techniques, and other similar techniques are cost-effective and very suitable for high-volume production lines. The electrodes are preferably located near vents which allow the venting of gases generated during the application of the high electric fields associated with electrophoresis. The vent ports could be simple openings in the tube itself or gas permeable hydrophobic membranes such as Gore-Tex®.--

Please replace the paragraph beginning at page 13, line 21, with the following paragraph:

--Electrodes positioned in the transition region and areas prior to the transition region, e.g., the reaction chamber 40, may facilitate movement of fluid into the transition region 60. Embedded electrodes **70A**, **70B** are shown by the form of the two-way valve configuration in Figure 3C. The electrode **70A** is embedded in the reaction region **40** and the second electrode **70B** is embedded in a channel **72** immediately downstream from the valve **64**. The electrodes **70A**, **70B** protrude through the body of the device to be partially exposed to the fluid inside of the chamber and channel.--

Please replace the paragraph beginning at page 20, line 7, with the following paragraph:

--The devices of the present invention may be produced by injection molding, casting, machining or other convenient means of making a one-piece body without bonding multiple

pieces together. Molding allows for formation of a contiguous reaction chamber, transition region, and separation region. Valve structures may also be included in the mold, or in the alternative, added to device after the body is molded.--

Please replace the paragraph beginning at page 21, line 8, with the following paragraph:

--Furthermore, electrodes may be "overmolded" by partially inserting electrodes at their selected locations into the mold such that the electrodes become embedded in the body after the material is added to the mold and allowed to solidify. The electrodes may be made of platinum, silver, carbon, gold or any other suitable electrically conductive material. Other components may be optionally overmolded to the device in a similar fashion.--

Please replace the paragraph beginning at page 21, line 15, with the following paragraph:

--In the alternative, after the body is formed, electrodes, filters, resistive heating elements, etc. may be embedded into the body using screen-printing or thin-film depositing techniques. Reagents, matrices or fluids may be injected into various reservoirs and channels of the formed body. Furthermore, the device may include components external to the body, such as optics, electrical connections to the electrodes, heater(s) embedded in the body, pneumatic interfaces to pumps or vacuums, etc. Alternatively, such components may be located in an external instrument into which the device is placed for sample processing, as described above.--

Please replace the paragraph beginning at page 21, line 24, with the following paragraph:

--To summarize, the entire assembly of the reaction chamber, transition region, and separation region are preferably formed in a disposable body. There are a number of reasons why the device of the present invention is much improved over prior implementations.

1) the entire device is disposable, so that sample carry-over and contamination from sample to sample is not a problem;
2) all major elements of the device are integrated into one analytical component; it is not necessary to transfer the sample or the reaction products from one device having a reaction chamber to a separate device having a separation tube;